Federal Democratic Republic of Ethiopia

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ET 555 (2001) (English): Code of practice for pasteurization and handling of milk

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ETHIOPIAN STANDARD

ES 555:2001

(Reaffirmed :2012)

First edition

Code of practice for pasteurization and handling of milk

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Foreword

This Ethiopian Standard has been prepared under the direction of the Technical Committee for Food Products in general (TC 91) and published by the Ethiopian Standards Agency (ESA).

The standard is a reaffirmation for reprint of the Ethiopian Standard ES 555:2001 Code of practices for pasteurization and handling of milk, with some editorial changes without altering the technical contents in the former text.

Code of practice for pasteurization and handling of milk

1 Scope

This code of practice gives general recommendations for hygienic conditions and practices in the milk production, processing transportation and distribution operations.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Ethiopian Standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Ethiopian Standard are encouraged to investigate the possibility of applying the most recent editions of the Ethiopian Standards indicated below. Registers of currently valid standards are maintained in the Ethiopian Standards Agency .

ES 577, *Recommended code of practice – General principles of food hygiene*.

ES 588, *Hazard analysis and critical control point (HACCP) system and guidelines for its application.*

ES ISO 3356, *Milk and dried milk, buttermilk and buttermilk powder, whey and whey powder – Determination of phosphatase activity (Reference method).*

ES ISO 5541-1*, Milk and milk products – Enumeration of coliforms – Part 1: Colony count technique at 30 °C.*

ES ISO 5541-2*, Milk and milk products – Enumeration of coliforms – Part 2: Most probable number technique at 30°C.*

ES ISO 6610*, Milk and milk products – Enumeration of colony forming units of microogranisms - Colony count technique at 30°C.*

3 Definitions

For the purpose of this standard, the following definitions shall apply.

3.1
shed or barn
place where cattle rest, feed and/or are milked

3.2
processing
act of pasteurization and manufacture of butter, cream cheese and other milk and milk products

3.3
pasteurization
a heat treatment process applied to a product with the aim of avoiding public health hazards arising from pathogenic micro-organisms associated with milk

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3.4
batch pasteurization
a heat treatment process accomplished by exposing milk and milk products to a temperature of 63^{O}C for 30 minutes duration

3.5
continuous or HTST (high temperature short time) pasteurization
a heat treatment process accomplished by exposing milk and milk products to a temperature of 72^{O}C for 15 seconds

3.6
disinfection
a process that reduces the number of bacteria in dairy plant and utensils to a level consistent with acceptable quality control and hygienic standards

3.7
hygiene
clean or healthy practices

3.8
disinfect
get rid off potentially harmful micro-organisms by chemical means

3.9
pasteurized product
a milk or fluid milk product which has been subjected to pasteurization, which if retailed as such has been cooled without delay and has then been packaged with minimum delay under conditions which minimize contamination. The product must give a negative phosphatase test immediately after heat treatment

3.10
phosphatase
an enzyme that is always present in raw milk and that is inactivated by pasteurization process

3.11
peroxidase test
a method which determines whether or not milk has been heated during the pasteurization process to a temperature above 78^{0}C at which point the enzyme is inactivated

3.12
milk stone
a deposit that contains calcium caseinate and calcium phosphate

3.13
methylene blue test
a dye reduction test which measures the extent of bacterial contamination and its activity in pasteurized milk

3.14
plate count
the number of bacteria and other microorganisms which are present in a sample of milk and are viable and countable under the conditions of the test

3.15
sterilization
a process intended to destroy all living organisms

3.16
hazard
a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect

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3.17
HACCP
a system which identifies, evaluates and controls hazards which are significant for food safety.

4 Requirements

4.1 Requirements in milk production

4.1.1.1 Cattle shed or barn

a) cattle shall not be kept under the same roof with human and shall then be housed in appropriate sheds or barns.

b) the shed or barn shall be designed to provide comfort and sanitary conditions to the animals.

c) the planning and lay out shall provide adequate facilities for drainage and waste disposals.

d) the area shall be protected from rodents, pests, flies and other agents of infestation.

e) there shall be safe and potable water and the facilities for providing this to the animals.

f) the sheds and barns shall be well ventilated and adequately lighted.

g) there shall be drinking, feeding and resting areas in the barns and sheds.

4.1.2 Cattle health

a) keeping the cattle healthy is the starting point for producing hygienic milk. There shall be a health programme which takes care of vaccinations for the common contagious diseases, regular cleaning of the animals and disinfection of premises.

b) animals suffering from contagious diseases including mastitis shall be segregated from healthy ones.

4.1.3 Milking practices

a) it is preferable to milk cows at a separate place other than their resting shed or barn.

b) the milking area shall be clean and free from dust.

c) milk bearing utensils shall be cleaned and disinfected before use.

d) the milkers shall be healthy and free from contagious diseases and shall wear clean clothes.

e) milkers shall have clean and decent habits. They shall not smoke or shall not eat or clean their noses during milking.

f) milkers shall wash their hands with soap and clean water and dry them with clean towels.

g) long hairs on cows, flanks, hind legs, tail and udder shall be clipped at frequent intervals.

h) before each milking the udder and teats of the animals shall be washed and cleaned by clean water and dried with clean cloth towel.

i) foremilk shall not be allowed to run on the floor. It shall be collected in separate receptacles.

j) abnormal milk shall not be allowed to be mixed with normal milk.

4.1.4 Milking equipment

a) utensils and equipment that come into direct contact with milk shall be smooth, corrosion resistant and easy to clean and disinfect.

b) equipment shall be cleaned and disinfected at the end of each working phase and at least once each working day.

c) acceptable non-toxic and non-corrosive cleaning and disinfectant agents shall be used for cleaning and sanitization.

d) after cleaning and sanitization, the utensils and equipment shall be stored in a clean place to prevent recontamination from flies, insects, dust dirt, rodents etc. They shall be placed in an inverted portion to facilitate drainage of wash water.

4.2 Milk room

The milk room shall be clean.

The room should be cleaned and disinfection everyday.

4.3 Milk collection points/chilling centers

a) the collection and chilling centers shall preferably be situated in an open clean, and healthy surroundings away from road-side, where lot of dust arises due to motor traffic, garbage dumps, cattle sheds, open sewage drains or other areas that likely breed flies.

b) it shall be free from sources of obnoxious fumes, smoke, odours or excessive dust.

c) there shall not be accumulation of trash, garbage or similar waste in the vicinity of the centre.

d) rooms in the milk collecting and chilling centres shall be clean and shall be free from contaminating agents.

e) the rooms shall be supplied with adequate facilities for cleaning and disinfecting of containers, utensils and any other equipment.

f) the floors of the rooms of the centers shall be constructed of concrete or other impervious material to facilitate cleaning and disinfection. It shall also be suitably inclined to ease drainage.

g) the walls and ceilings shall have smooth non-absorbent surfaces so that they can be efficiently cleaned.

h) the building shall be well lighted and adequately ventilated.

i) the rooms shall have facilities to accommodate equipment, disinfectants, cloth towels and other materials required for collecting and cooling milk.

4.4 Milk reception and cooling

4.4.1 Reception

As soon as the milk is received it should be subjected to:

a) acidity tests; and

b) organoleptic tests.

4.4.2 cooling

a) the accepted milk shall be strained and cooled immediately to preferably 4^0C but not more than 8^0C.

b) rejected milk shall not be mixed with good milk.

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c) cleanliness of the milk cooling equipment shall be ensured. When surface coolers are used, they shall be provided with shields for protection from air contamination.

d) the milk shall be agitated regularly while being cooled.

4.5 Transportation of milk

a) during transportation of milk in aluminum or stainless steel or food grade plastic cans from villages and collection centers adequate precautions shall be taken to ensure that the quality of milk remains the same.

b) the cans shall have well fitting lids.

c) the cans shall be adequately protected from sunshine, rain or dirt shall not be allowed to come in contact with the inner portion of the can.

d) water from dripping vegetation or splashes on the road shall not be allowed to come in contact with the cans.

e) no other material shall be loaded on the same vehicle which carries the milk.

f) when road tankers are used to carry milk, they shall be so designed that agitation is prevented during transport.

g) all the hygienic practices for preservation of milk shall be borne in mind while using the tanker system for transporting milk.

h) the internal surface of the tanker has to be smooth, corrosion resistant and easy to clean and disinfect.

i) the edge of the manhole in the tanker shall be flanged upwards to prevent dripping into when the tank lid is lifted. A special cover has to be provided over the lid for protection from dust or dirt from the road. Similarly, a cover shall be provided over any valve or hose connector.

j) the vehicles and milk containers/tankers have to be designed and equipped in such a way that the temperature of the milk shall not be allowed to raise.

4.6 Dairy plant

4.6.1 Location

The dairy plant shall preferably be situated in an open, clean, and healthy surroundings away from road-side where lot dust arises due to motor traffic, garbage dumps, cattle sheds, open sewage drains or other places likely to breed flies. It shall be free from sources of obnoxious, fumes, smoke odours or excessive dust. There shall not be accumulation of trash garbage or similar waste in the vicinity of the plant. Road ways and yards serving the dairy plant and which are within its boundaries or in its immediate vicinity shall have a hard paved surface suitable for wheeled traffic. There shall be adequate drainage and provision shall be made to allow for cleaning.

4.6.2 Building

a) structures housing the dairy plant shall be suitable in size, construction and design to facilitate maintenance and hygienic operations for procession purposes. It shall provide sufficient space for housing of equipment and storage materials for both raw milk and finished products.

b) there shall also be adequate space for satisfactory performance of all operations.

c) building materials used shall be of the type that ensure cleanliness.

d) the design shall be such as to permit easy and adequate cleaning and to facilitate proper supervision of food hygiene.

e) the buildings and facilities shall be designed to prevent the entrance and harboring of pests and the entry of environmental contaminants such as smoke, dust etc.

f) buildings and facilities shall be designed to provide separation by partition, location or other effective means between those operations which may cause cross contamination.

g) the dairy plant shall be adequately lighted and ventilated keeping in mind the number of workers, the length of working hour and the nature of operation.

h) floors shall be non-slip, washable properly sloped towards the drainage system. It shall be heat resistant, non-absorbent, easily cleanable and resistant to acids, alkalis and hot substances.

i) wall shall be smooth washable, non absorbent light coloured surface free from crevices and sharp angles to facilitate efficient cleaning.

j) where possible, service pipes and conduits shall be sunk into walls or fixed well clear of wall surfaces to facilitate cleaning.

k) wall shall be well insulated to avoid condensation and deter infestation.

l) ceiling shall be designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation mould development and flaking and shall be easy to clean.

m) plant premises shall have the best possible lighting provided from ceiling mounted fluorescent lights.

n) the fittings shall be of plastics or glass, covered with plastic shields to prevent fragments of glass entering milk and milk products.

o) the ventilation system shall be designed to prevent excessive heat, steam, condensation and dust and to remove contaminated air. The direction of the air flow shall never be from dirty area to a clean area. Ventilation openings shall be provided with a screen or other protecting enclosures on non corrodible material. Screens shall be easily removable for cleaning.

p) all internal joinery work shall be of simple design and finished to a high standard of workmanship. A high glossy surface is required. Unplasterized polyvinyl chloride (UPVC) surfaces are preferred for doors windows etc.

q) all windows shall have fly screens fitted to the outside which should be removable for cleaning and the sills shall be slopping.

r) all doors shall be flush finished on the interior side, capable of easy cleaning and shall be protected on both sides by non-corroding metal kick plates to prevent damage which may provide access for rodents.

s) service shall be installed using suitable piping lagging and conduits to facilitate cleaning and maintenance. Service lines shall be positioned to minimize potential contamination to the product and minimize potential hazard in the workplace.

t) considerable quantities of potable water are needed. Running water under pressure shall be easily accessible to all rooms and areas in which milk is handled and equipment are washed. The water shall be microbiologically tested at least twice a year and especially following cleaning and disinfection of water storage tanks.

u) In cases where the total water hardness exceeds 500mg/l (as CaCO3). Water softeners shall be used for all water where heat treatment cleaning or rinsing is involved.

v) water storage tanks of adequate capacity shall be provided to ensure at least one day’s supply in case of supply failure. A reserve water source shall be available in case the main supply fails.

w) the tanks and contents shall be inspected at frequent intervals and emptied cleaned and disinfected as necessary and at least once per year.

4.6.3 The dairy premises

A well designed unit is needed to enable milk to be handled, processed or stored. In order to achieve these, separate units shall be constructed to accommodate milk reception and raw milk storage, pasteurization and packaging area, milk can and crate cleaning area, butter and fermented products processing area and storage rooms.

4.6.3.1 Milk reception and storage

a) a separate area for milk reception and storage shall be provided.

b) the area for milk reception shall be accessible and suitable for milk delivery by trucks or road tankers.

c) it shall have facilities for measuring incoming milk.

d) it shall be secured and covered with adequate ventilation to remove exhaust fumes from milk delivery vehicles.

4.6.3.2 Pasteurization and packaging areas

a) there shall be a separate room from that used to wash milk cans and crates, and for their storage prior to washing clean milk cans, crates and single service containers sufficient for immediate needs may be held in this area prior to filling.

b) a wash hand basin complete with suitable drainage, hot and cold water, soap and towel shall be provided in the pasteurization and packaging area.

4.6.3.3 Cleaning and storage area

a) the cleaning area shall be sited so as not to give rise to risk of contamination of milk containers and crates.

b) the storage for dirty milk cans and crates shall be adjacent to the cleaning areas.

c) pasteurized milk shall be kept in cans, single service and other containers in a separate refrigerated store which will keep the temperature of the milk at 5^0C or below.

d) the refrigerated store shall be so constructed and sited as not to give rise to risk of contamination of the milk.

e) there shall be adequate dry and clean space for storage of single service and other milk containers.

f) all clean milk cans and containers shall be stored in a clean place and shall be protected from dirt and contamination .

5 Pasteurization of milk

5.1 Holder (batch) pasteurization

The holder or batch pasteurization process consists of heating milk to 63^0C and retaining it at this temperature for at least 30 minutes.

This process shall use a vessel of stainless steel with an insulated outer jacket through which the necessary heating and cooling media can flow. The vessel shall be fitted with an agitator which rotates continuously during pasteurization to give rapid and uniform heating of the milk. To avoid butter fat damage, slow speed large diameter paddles shall be used.

A temperature control device that automatically regulates the heating of the milk shall be required. The device shall be in a state of consistent and safe operation.

5.1.1 Operation sequence

The milk is heated by hot water in the jacket in the disinfected pasteurizer vessel. The milk is throughly but slowly mixed by the agitator during heating. The temperature of the milk is held between 62.8^{0}C and 65.6^{0}C for a minimum of 30 minutes. The milk is then cooled immediately to a temperature not higher than 5^{0}C.

5.2 HTST (continuous) pasteurization

In this process the heating and cooling of milk are carried out continuously in stainless steel plate heat exchangers.

5.2.1 Parts of HTST system

a) plate heat exchanger;

b) balance tank;

c) milk pump;

d) flow control unit;

e) boiler;

f) milk filter;

g) flow diversion valve;

h) thermograph.

i) holding time device

5.2.1.1 Plate heat exchanger

a) the plate heat exchanger shall be resistant to corrosive effects of coolants and chemical disinfecting agents.

b) the plate heat exchanger shall comprise regenerative heating and cooling sections of a capacity that suits the daily processing requirements.

5.2.1.2 Balance tank

The HTST system shall have a balance tank fitted with a float operated valve. The tank provides a constant head of milk to feed the milk pump and receives any milk rejected during diversion. It can also be used as the header tank for the circulation of solutions during cleaning in place (CIP). The valve provides shut-off against the milk supply.

5.2.1.3 Pump

Stainless steel centrifugal milk pump that can pump milk, cleaning liquids, disinfecting hot water, or lime water through the system shall be required.

5.2.1.4 Flow control

A flow control unit that regulates, the flow of milk to the plate heat exchanger shall be fitted to the system.

5.2.1.5

There shall be a hot water supply and pump that circulates water through the plate heat exchanger to raise the milk to pasteurization temperature.

5.2.1.6 Filter

Milk filter or clarifier shall be a component of the pasteurization system.

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5.2.1.7 Flow diversion value

The pasteurization plant shall be fitted with flow diversion valve. The flow diversion valve assembly is automatically actuated if the temperature of milk falls below the preset level and responses instantaneously and guarantees that no unpasteurized milk goes forward.

5.2.1.8 Thermograph

The thermograph situated in the control panel, gives an automatic and permanent record of every operation of the plant from start-up to final activity.

5.2.1.9 Holding time device

The plant shall have a holding time device that ensures that the milk will be held for a minimum of 15 seconds at pasteurization temperature (72^0C) before passing to the cooling stage.

5.3 Sequence of operation

Raw milk flows from the storage or receiving tank to the balance tank. The milk is pumped to the regenerative section of the plate heat exchanger. The raw milk is preheated and passes to the filter and then to the heating section. The milk at the pasteurization temperature flows through the holding tubes. The milk is automatically diverted back to the balance tank when the flow diversion assembly and temperature controller sense the temperature of the milk has fallen below the pasteurization temperature. After pasteurized milk returns to the plate heat exchanger for cooling. The pasteurized milk shall be maintained below 5^0C.

6 Reception and storage of raw milk before processing

Milk from a healthy cow is expected to contain relatively few bacteria. Subsequent handling on the farm, collection and cooling centers, delivery to the dairy plant and storage condition before pasteurization can cause contamination of raw milk. The length of time from production until processing and the temperature of milk until it is pasteurized also influence the number of bacteria in the milk.

Milk producers should follow hygienic practices during milking and handling of the milk before delivery to the collection center. They must use clean water and detergents to clean any material that comes into contact with milk. They must use appropriate utensils (stainless steel aluminum, food grade plastic etc. milk containers) during milking and carrying the milk to the collection centres. If the milk is not delivered in a short time after milking it must be cooled by any available means to below 10^0C.

In the collection centers the milk shall be tested before joining the bulk. The tests include:

a) organoleptic tests and temperature measurement;

b) density measurement; and

c) alcohol test.

The collection center shall keep the milk from contamination by using clean utensils and keeping the milk cool until it is transported to the cooling center. The milk shall be delivered to the cooling center as soon as possible.

The cooling center shall keep the milk to less than 8^0C as soon as it has accepted from the collection centres. Similar tests to that of the collection centers can be carried out at the cooling centers.

Delivery to the milk plant shall be carried out using sanitized cans or insulated cooling milk carriers. All untensils and containers coming into contact with milk shall be clean and disinfected preferably by the dairy plant.

The milk should be inspected prior to acceptance and the following tests shall be undertaken in addition to other tests carried out by the plant.

a) The appearance and smell shall be typical of fresh milk, sweet and clean;

b) The temperature shall be measured;

c) Alcohol test shall be done;

d) Milk fat test shall be made.

7 Packaging storage and handling

Milk should be packed and handled in hygienic conditions. Milk containers, bottles, and cans should be cleaned effectively and disinfected before use. Polyethylene plastic for packaging milk must be kept in a clean store. After packaging the milk, the essential storage and handling practices shall be as follows.

a) keep the packaged milk as cold as possible preferably below 5^0C to restrict the growth of micro-organisms to a minimum.

b) deliver the milk to consumers as soon as possible. Use refrigerator or insulated transporters to deliver the milk to distribution depots.

c) avoid exposing the milk to conditions (direct sunlight etc) that bring off flavours to the milk.

d) cold storage facilities which can keep the milk below 5^0C should be provided at distribution depots.

8 Hygienic management

Managers of milk plants are recommended to adopt the principle of ES 588 and ES 577 in addition to this code of practice.

8.1 Hygienic practices

8.1.1 Personnel hygiene

The following are requirements for personnel hygiene in the dairy plant.

a) no person suspected of being infected with any notificable disease is allowed to work in the dairy plant.

b) personnel shall be made aware of hygienic standards in the dairy plant since carelessness at any stage will endanger the health of consumers.

c) personnel have to wear, clean washable overalls and footwear and headgear (uniform) which completely encloses the hair.

d) the uniform shall not be worn outside the dairy but put on just before starting work and changed when leaving.

e) adequate hand washing facilities with a constant supply of hot and cold water and suitable hand drying facilities have to be provided within the dairy for plant personnel.

f) soap, towel and nailbrush have to hand basin.

g) separate room for changing clothes shall be provided and clothes shall not be hung in any processing room.

h) eating, spitting, nose cleaning or the use of tobacco in any form including smoking shall be prohibited in the plant.

i) sufficient and suitable sanitary conveniences shall be provided (separate for each sex). These shall be properly lighted maintained and kept clean. They shall not open directly into any work room in the dairy.

j) sufficient number of wash basin be provided adjacent to with provision of soap, towels, latrines and urinals shall be provided, conveniently situated and accessible to workers at all times while they are at the dairy.

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k) all staff have to be trained in hygienic matters in dairy plants.

l) personnel shall be regularly examined and shall have health certificate.

8.1.2 Cleaning and disinfection of equipment

All milk contact surfaces are potential sources of contamination. A high standard of hygiene in the dairy and effective methods for cleaning and disinfecting equipment is required.

8.1.2.1 Recommended steps in cleaning and disnfection of equipment in a dairy plant

In a cleaning and disinfection process in a dairy plant the following steps for successful cleaning and disinfection shall be performed.

a) a preliminary rinse with water immediately after processing has ceased shall be undertaken to remove milk residue, scale or other deposits that have to be removed from plant parts and containers.

b) treatment with detergent solution shall be carried to clear residues and dirt from surfaces.

c) one or more rinse of the cleaned surfaces with clean water shall be carried out to free the surfaces from released contamination and detergent solution.

d) periodic treatment by appropriate solution to remove milk stones shall be necessary.

Note: Care shall be taken in selecting the appropriate and effective type of disinfectant for use in the dairy plant.

9 Inspection for determining the hygienic condition of a dairy plant

The main reason for determining dairy plant hygiene is to ensure that the equipment will not contaminate the product with microorganism which might lead either to product spoilage or to food poisoning. Regular hygiene checks provide information to plant manager and inspectors on the effectiveness of the practices which are in use for cleaning and disinfection.

Systematic visual inspection, chemical and physical analysis and interpretation of laboratory and production records are important in ensuring consideration of factors such as visible dirt, residues, malfunction of equipment, residues from cleaning materials and corrosion of equipment surfaces. Bacteriological tests also provide additional information.

Visual inspection is the most rapid, cheapest and easiest method of examination. Systematic inspection of the accessible parts of equipment gives a valuable indication on the cleanliness of the pasteurization installation and an ancillary equipment.

Visual inspection shall include all storage tanks balance tanks, agitators, pumps, pipe fittings with their washers and gaskets, filling machine bowls, crates, bottles and packaging materials. Inspection shall be made using bright torch or by ultraviolet light. Plant surface shall be wiped with clean disposable muslin or strong tissue paper to check for evidence of a film or soil residue on un cleaned equipment.

After examination, plant parts and items that have been inspected shall be disinfected following reassembly and before use.

10 Pasteurized milk quality

Regular chemical and microbiological examinations shall be made on pasteurized milk to ensure that safe and efficient working practices have been performed.

Summary of the tests concerned with pasteurized milk are described in table 1.

Table 1 — Summary of laboratory tests concerned with pasteurized milk

Specified test	Frequency of test	Possible causes of failure	Remedy
Phosphatase test Target level 0 g p-nitrophenol per ml milk	Daily	Failure to use the correct time/temperature condition or contamination with raw milk	Ensure that the flow divert is set to activate at 72°C or above and is operating correctly. Avoid contamination check gaskets and heat exchange plates for leaks.
Plate count at 21°C after incubation at 60°C for 5 days Target level ≤ 50,000/ml	Daily	Post pasteurization contamination	Intensify hygiene practice especially for equipment involved after heat treatment, check water quality.
Coliform count Target level absent	Daily	Post pasteurization contamination	Intensify hygiene practice especially for equipment involved after heat treatment, check water quality.
Peroxidase test Target level positive reaction	Once every fortnight	Excess temperature during pasteurization and or repeat pasteurization	Check the holding temperature and milk flow rate. Check all thermometers controlling the temperature in the heating and holding section. Check the function of the hot water set.
Plate count at 30°C Target level < 30.000	Daily	Excessively high numbers of heat resistant, bacteria in the raw milk. Un hygienic conditions during storage of raw milk. Un hygienic condition in pipe lines storage tanks and packaging equipment post pasteurization contamination	Check the quality of raw milk supplies time and temperature of milk storage, hygienic condition of all equipment in use.
Pathogenic micro organisms Target level = absent in 25 grams	When indicated by the results of other preliminary tests	As advised under plate count and coliform test	As advised under plate count and coliform test. Exclude milk from human consumption

11 Cleaning and disinfection

Cleaning in place systems

a) pass cold water through the pasteurization system.

b) circulate a solution of a suitable general purpose disinfectant. Use the recommended temperature and contact time.

c) flush the system with clean water to ensure adequate rinsing.

d) if a detergent/disinfectant has been used no other treatment is necessary.

e) if a detergent only has been used disinfect either by hot water or chemical disinfecting agents.

f) rinse residue using cold and clean water after discharging circulating waste. Use the equipment (system) immediately or else re-disinfect immediately prior to use.

Whilst the practice of cleaning in place is widely used and is applied to as much dairy equipment as possible, the need for the periodic manual cleaning remains.

All equipment in the dairy plant shall be cleaned and disinfected properly to ensure that there will not be any contamination by un hygienic conditions of the equipment.

The following equipment shall be cleaned and disinfected.

a) pumps and pipe lines;

b) storage and transport tanks;

c) heat exchangers batch or continuous;

d) cotton filter cloths;

e) separator;

f) homoginizers;

g) water softeners;

h) washing machines;

i) milk bottles;

j) milk cans;

k) crates (bottles and plastic bags); and

l) container filling machines.

12 Plant maintenance and inspection

The operational efficiency of equipment used in the dairy plant is among the factors that affect the efficiency of the milk processing operations.

It is essential that equipment is operated to its design characteristics and is maintained in accordance with the instructions and suggestions of the supplier.

A systematic maintenance programme shall be brought into effect during the commissioning stage of the installation and be agreed by the company's technical staff and those of the suppliers.

The details of maintenance programmes including "action" information shall be properly kept and available to appropriate persons within the dairy plant.

Regular and systematic programmes of inspection and maintenance by management, production maintenance and laboratory staff shall be designed.

A daily check of plant operation records temperature record charts and quality tests shall be made by the concerned plant staff and any abnormality shall be reported immediately.

The premises used for milk processing equipment shall be inspected daily for cleanliness and general hygiene. The general appearance of the processing equipment and processing rooms shall be attractive and shall demonstrate attention to hygiene.

The daily inspection shall also include all areas of the processing premises that is the exterior of the processing plant and ancillaries, the floors, walls and ceilings of the premises.

Inspection of all areas of the premises shall be undertaken daily to ensure that vermin are being controlled effectively.

It is vital that staff develop and maintain a strong commitment to personal hygiene and cleanliness within dairy premises.

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Ethiopian Standards Agency

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010.ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1970.

ESA's objectives are:-

- Develop Ethiopian standards and establish a system that enable to check weather goods and services are in compliance with the required standards,
- Facilitate the country's technology transfer through the use of standards,
- Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational Institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/ or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.
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International Involvement
ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM).It is a founding member of the African Regional Organization for standardization (ARSO).

More Information?
Contact us at the following address.
The Head Office of ESA is at Addis Ababa.

☎ 011- 646 06 85, 011- 646 05 65
📠 011-646 08 80
✉ 2310 Addis Ababa, Ethiopia
E-mail: info@ethiostandards.org,
Website: www.ethiostandards.org

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